

The Transactions of the American Institute of Chemical Engineers. Vol. iv., 1911. Pp. iv+514. (New York: D. Van Nostrand and Co.; London: E. and F. N. Spon, Ltd., 1912.) Price 30s. net.

Two addresses delivered by the president, Dr. F. W. Frerichs, at Chicago and Washington are chiefly devoted to descriptions of six problems in chemical engineering practice. One of these, the extraction of bismuth from carbonaceous ores, consists of a complete account of the recovery of this metal from ores containing 1 oz. of lead, 15 oz. of silver 5 per cent. lead, and 5 per cent. of bismuth. The metal can be produced greatly in excess of the consumption, which in 1910 was about 200,000 lb for the United States. It is used almost exclusively for medicinal purposes.

Mr. Clarence Hall, explosives engineer, United States Bureau of Mines, contributes an interesting paper on explosives used in engineering and mining operations. The apparatus used at the Pittsburg testing station for the determination of the relative energy and efficiency of various explosives, such as black powder, granulated nitroglycerine powders, and nitro-glycerine and ammonia dynamites, is described. Mettegang's recorder for determining the rate of detonation is used, and velocities of detonation up to 6246 metres per second have been found for 60 per cent. nitroglycerine dynamites. The recorder has a soot-covered bronze drum 500 mm. in circumference which can be driven up to 105 revolutions per second, and marks are made thereon by electrical contact devices.

The manufacture of gelatine is described by Mr. Ludwig A. Thiele. The raw materials are bones, from which osseine is derived, and hidestock. The process is the same for the osseine and hidestock, the former being got from the bones by treatment with either hydrochloric, phosphoric, or sulphurous acid, during which process a valuable by-product, acid phosphate, is produced. A report of the Committee on Chemical Engineering Education is included in the volume, together with other papers on manufacturing processes.

Science French Course. By C. W. Paget Moffatt. Pp. x+305. (London: W. B. Clive, University Tutorial Press, Ltd., 1912.) Price 3s. 6d.

THE object of this book is, the author says, to provide students of science who desire to read French scientific literature with the necessary minimum of French grammar, and a selection of extracts from which some practice may be obtained. For students with no knowledge of French at all the amount of assistance given in translation appears rather inadequate, but for those who have forgotten what was learnt at school and wish to revise rapidly, the book should prove of great assistance. The extracts will form excellent reading in French for boys and girls in the upper forms of secondary schools who are taking a course of work in science.

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LETTERS TO THE EDITOR.

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The Synthesis of Matter.

IN the issue of NATURE for July 18 last, there appears an important letter from Sir William Ramsay dealing with the appearance of hydrogen, helium, and neon in the glass of exhausted X-ray bulbs. This result is of great interest, and may have an important bearing in addition to that mentioned by the author.

It is well known that X-ray bulbs only possess a limited period of life and go "soft," as it is termed, as if a small amount of gas previously adsorbed by the glass had been set free. The thought occurred to me some time ago that the softening might not be due to this cause, but to rare gases, such as helium, actinium, &c., produced from the æther of the vacuum becoming charged with energy from the kathode. It is such gases which are found in the process known as inorganic evolution in the hottest stars and nebulae, and discovered there first by Lockyer, before their terrestrial occurrence in cleveite and elsewhere was detected by Ramsay.

If elements can decompose with evolution of energy as in radio-activity, it would seem not impossible that matter might be synthesised with absorption of energy, and that a first stage in such a process might be the formation of electrons by the charging of æther with a permanent form of energy, followed by a synthesis of ordinary matter in which such gases as helium would be a first product.

Attempts were made by me at the time to obtain evidences of helium from exhausted X-ray bulbs, but failed, as I now believe, from the small quantity of gas available and my lack of training in this very specialised field of manipulation. It would be interesting to carry out a prolonged experiment with an X-ray bulb run for days, and pumped out at intervals, in order to ascertain whether such development of helium took place.

It is, of course, possible that any gas so arising might come from the electrodes and glass undergoing atomic disintegration, but the possible origin of matter from æther when there is an available supply of energy at high potential should not be lost sight of. Theory suggests that such a formation is possible, if matter consists of vortex rings or other permanent forms of periodic movement of the æther, and it may be that in the chromosphere spectra there is evidence of production of matter occurring at the present time.

BENJAMIN MOORE.

The Bio-Chemical Department, the University,
Liverpool, October 9.

The Jaw from the Stalagmite in Kent's Cavern.

I AM much obliged to Prof. Keith for his reply to my letter on the Kent's Cavern jaw, from the granular stalagmite. As my friend Prof. Boyd Dawkins, who read the paper, was a member of the Kent's Cavern Committee, and reported in 1869 on the fossils found up to that date, I naturally took for granted that all the facts of the case would be before Section H, and that Prof. Keith was challenging the evidence.

On referring to Prof. Boyd Dawkins's 1869 report I noted with surprise that the jaw was not even mentioned. To those acquainted with the history of Kent's Cavern this omission is easily explained.

Throughout the explorations of the cavern, beginning in 1825, all the evidence in favour of the antiquity of man was challenged and explained away by outside critics. Objects in and under the stalagmite were accounted for in one of the following ways, viz.: (1) interments; (2) cracks or fissures; (3) the stalagmite was a comparatively recent invading magma!

For these reasons it would have been unwise, in 1869, to depend on any evidence so certain to be challenged. Indeed, the value of the evidence of the said jaw has not been publicly discussed up to the present time.

After Pengelly's death Sir John Evans published the second edition of his "Ancient Stone Implements," in which, alas! he seems to have followed the earliest explorers in the general assumption of fissures. Sir John observes that in the stalagmite there were few remains, "whether human or otherwise, and these for the most part may have fallen in from higher levels." He further observes that "concerning this long chapter in the history of human existence the records of the cavern are a blank." If I may venture to say so, the distinguished archæologist must have compiled his account of Kent's Cavern from early and late records as of equal authority.

So far as the weighty authority of the chairman of the Kent's Cavern Committee (but not on the committee when the jaw was discovered) is concerned, Prof. Keith would be fully justified in questioning the authenticity of the jaw in question.

In Pengelly's Glasgow lecture (1875) we find the words—"I have found teeth of the mammoth, teeth of the woolly rhinoceros, teeth of the cave hyæna, and teeth of the cave bear in the very uppermost part of the stalagmite; and a human jaw, with four teeth in it, at the base of the same deposit" (pp. 17-18).

In describing a bone pin found under the stalagmite, near the same spot as the jaw was found, Pengelly incidentally describes the stalagmite as "20 inches thick, perfectly intact, and *continuous in all directions*" (Report Brit. Assoc., 1867, p. 31). The italics are mine.

One item of evidence *per contra* must be noticed, viz. that "one of the artificially formed flints [from the stalagmite] has the appearance of being a fragment of a polished Celt or axe, and is the only specimen of the kind which has been found in the cavern." Nothing of the sort, we are told, was subsequently found.

It is much to be regretted that the British Association did not complete its sixteen years' exploration with a general summary of results, with plans and sections. There is, I believe, no general ground plan of the cavern in existence, except the rough sketch which I prepared for the last visit of the Geologists' Association (Proc. Geol. Assoc., vol. xvi., p. 437, 1900).

A. R. HUNT.

Torquay, October 7.

A Pearl from Nautilus.

THE accompanying photograph shows a pearl (natural size), alleged to have been found in *Nautilus pompilius*, from the Sulu archipelago. It was lent to me for examination by Mr. T. H. Haynes, of the Montebello Islands, north-west Australia, one of the

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pioneers of the pearl-shelling industry in Australia and the East Indies, who is now in England. This pearl was given to Mr. Haynes, about 1884, by a half-breed Chinaman named Oto, brother-in-law to the late Sultan of Sulu, Mohamed Budderuddin.

Mr. Haynes tells me that the pearly Nautilus is occasionally taken alive by the pearl-shell divers, by whom the flesh is considered a great delicacy. Now and then a pearl is found in a Nautilus, but as these pearls are considered unlucky they are usually thrown away. There is a superstition among the natives that, if a man fights with a Nautilus pearl in a ring on his finger, he will be killed. It is probable, there-



A Nautilus pearl. Natural size.

fore, that few, if any, examples of these Nautilus pearls have found their way into the West.

The pearl, which is a perfect pear-shape, slightly flattened at the broader end, weighs 18 carats (72 grains), and is composed of the porcellanous (not the nacreous) constituent of the shell. It is somewhat translucent, white, with a slightly creamy tinge, rather suggesting fine Belek china. The broad end, which has apparently been flattened by pressure of the shell upon the pearl sac, is rather more transparent and vitreous.

H. LYSTER JAMESON.

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Errors of the Computed Times of Solar Eclipse Phenomena.

WITH regard to Dr. Downing's letter on this matter (NATURE, October 10, 1912), may I be allowed to remark that I was fully aware of his warning that the computed eclipse times of second and third contacts were too late. In fact, I carried with me to Vavau the reprint of his paper to which he alludes (Monthly Notices R.A.S., vol. lxix., p. 31), which he had kindly sent me, and frequently consulted it. In addition, I had prepared an instrument for projection of the solar image so as to observe the angles of cusps given in his paper, but as Dr. Lockyer also had a similar instrument, we arranged that I should make use of his time signals.

As a further precaution, to obtain the time of the first flash, I had arranged a direct-vision spectroscope adjusted on the C line in the chromosphere at the angle of second contact. Unfortunately, the clouds at the time of second contact rendered all these precautions useless.

I trust that Dr. Downing does not read into my remark, "The total phase commenced about 20 seconds before the predicted time" (Proceedings R.S., No. A595), anything more than a mere statement of a fact.

A. L. CORTIE.

Stonyhurst College Observatory, October 14.